

## REMARKS

The office action of July 27, 2005 has been reviewed and its contents carefully noted. Reconsideration of this case, as amended, is requested. Claims 15-21, 23, 25-26, 28-33 and 36-40 remain in this case, claim 41 being cancelled by this response.

### Preliminary Comments

The specification was amended as follows:

- a. On pages 7 and 15 in the specification, and in the abstract, the term "search direction" was corrected to --search path--, and an unnecessary variable  $\hat{s}$  was deleted. , An extraneous "e", which was a typographical error, was deleted as well.
- b. On page 9, a typographical error was corrected - "constrained" to --unconstrained-- , consistent with the title of the section.

The claims were amended as follows, to correct typographical errors and other informalities. No new matter was introduced. Specifically:

- a. Claim 15 was amended as noted in the correction to the specification, above, to correct the term "search direction" to --search path--, and to delete an unnecessary variable  $\hat{s}$  . An extraneous "e", which was a typographical error, was deleted as well.
- b. In claim 28, the phrase "constrained nonlinear programming problem" was copied from the claim preamble into each step of the method, to emphasize and positively claim the nature of the method.
- c. In claim 28, the misspelled "chosing" is corrected to --choosing--

### **Rejection(s) under 35 U.S.C. §112**

1. The specification was objected to because it fails to define the meaning of the search direction "e xd", and Claim 15 was rejected because the claimed feature "search direction e xd" in the Claim was not well defined.

As noted above, the term "search direction" has been corrected to --search path--, which appears in the specification and in the claim (step b), and is well defined in the specification and claim. The terms "search direction" and "search path" are synonymous, and the "said search path" correctly refers back to step b, "moving along a search path...".

The "e" in the phrase "search direction e x<sub>d</sub>" was a typographical error, and has been deleted. Also, the variable  $\hat{s}$  was extraneous and has been deleted for clarity.

Applicant believes that these amendments have fully addressed the Examiner's rejections, and that therefore claim 15, and also claims 16-21 which depend upon claim 15, are now in condition for allowance. Reconsideration and withdrawal of the rejection are respectfully requested.

### **Rejection(s) under 35 U.S.C. §102**

2. Claims 28-33 and 41 were rejected under 35 U.S.C. 102(b) as being anticipated by Kohn et al, US patent no. 5,963,447. Applicant respectfully disagrees with the rejection.

Claim 41 has been cancelled, making the rejection of this claim moot.

As to claim 28, in making the rejection the Examiner stated that: "Kohn anticipates a method to obtain a global optimal solution of constrained nonlinear problem ... According to Kohn, the method includes steps

"Finding feasible components or constrains to the problem for solutions (cols. 25-36),

"Finding by integrating all local optimal solutions in each feasible components... "

Applicant respectfully disagrees with this characterization of Kohn et al.

The '447 patent does not claim a method of obtaining *a global optimal solution for a constrained nonlinear programming problem*, as claimed in Applicant's claim 28. Rather, the phrase "nonlinear process" in Kohn et al refers to a time-varying nonlinear process, distributed in time and space for which Kohn et al exercises near-optimal real-time control. Put another way, Kohn et al is a method of *control of dynamic processes*.

In contrast, the Applicant's method claimed in claim 28 as amended, is a *method of optimization of a constrained nonlinear programming problem*. Applicant's method applies to *static* (i.e. *not time variant*) programming problems - see, for example, equation (4.5) referred to in the claim. It can be seen that this equation is not time-dependent. (quoting from page 25 of the application):

Consider a general constrained nonlinear optimization problem of the form:

**Minimize**  $C(x)$

**Subject to** 
$$\begin{aligned} h_i(x) &= 0, & i \in I = \{1, \dots, l\} \\ g_j(x) &\leq 0, & j \in J = \{1, \dots, s\} \end{aligned} \quad (4.5)$$

where the objective function  $C: \mathbb{R}^n \rightarrow \mathbb{R}$  is a bounded below smooth function and both the equality constraint function  $h_i: \mathbb{R}^n \rightarrow \mathbb{R}$  and the inequality constraint function  $g_j: \mathbb{R}^n \rightarrow \mathbb{R}$  are continuous for all  $i \in I, j \in J$ .

In other words, Kohn et al is looking for *a near-optimal control of a process over time*, whereas the present application is searching for *one global optimal solution for a nonlinear programming problem*.

Therefore, it is respectfully suggested that the rejection of independent claim 28 as being anticipated by Kohn et al is overcome. Dependent claims 29 through 33, being dependent upon and further limiting independent claim 28, should also be allowable for that reason, as well as for the additional recitations they contain. Reconsideration and withdrawal of the rejection are respectfully requested.

### **Allowable Subject Matter**

1. Claims 36-39 were objected to as being dependent upon a rejected base claim, but the Examiner indicated that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With the arguments made above with respect to the patentability of independent claim 28, upon which all of these claims depend, applicant believes these claims are now allowable and such action is respectfully requested.

2. Applicant gratefully acknowledges Examiner's statement that claims 23, 25, 26, 40 are allowed.

### **Conclusion**

Applicant believes the claims, as amended, are patentable over the prior art, and that this case is now in condition for allowance of all claims therein. Such action is thus respectfully requested. If the Examiner disagrees, or believes for any other reason that direct contact with Applicants' attorney would advance the prosecution of the case to finality, he is invited to telephone the undersigned at the number given below.

"Recognizing that Internet communications are not secured, I hereby authorize the PTO to communicate with me concerning any subject matter of this application by electronic mail. I understand that a copy of these communications will be made of record in the application file."

Respectfully Submitted:  
Hsiao-Dong Chiang

By: 

Michael F. Brown, Registration No. 29,619, Attorney for Applicant

BROWN & MICHAELS, P.C.  
400 M&T Bank Building - 118 N. Tioga St.  
Ithaca, NY 14850  
(607) 256-2000 • (607) 256-3628 (fax)  
e-mail: docket@bpmlegal.com  
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